

[57]

ABSTRACT

Force feedback in large, immersive environments is provided by device which a gyro- stabilization to generate a fixed point of leverage for the requisite forces and/or torques. In one embodiment, one or more orthogonally oriented rotating gyroscopes are used to provide a stable platform to which a force-reflecting device can be mounted, thereby coupling reaction forces to a user without the need for connection to a fixed frame. In one physical realization, a rigid handle or joystick is directly connected to the three-axis stabilized platform and using an inventive control scheme to modulate motor torques so that only the desired forces are felt. In an alternative embodiment, a reaction sphere is used to produce the requisite inertial stabilization. Since the sphere is capable of providing controlled torques about three arbitrary, linearly independent axes, it can be used in place of three reaction wheels to provide three-axis stabilization for a variety of space-based and terrestrial applications.

~~24 Claims, 14 Drawing Sheets~~

09000254 062104

Ro
2/12/200R

Patent Assignment Abstract of Title

Total Assignments: 2

Application #: 08736016 **Filing Dt:** 10/22/1996 **Patent #:** 5754023 **Issue Dt:** 05/19/1998

PCT #: NONE

Publication #: NONE

Pub Dt:

Inventors: GERALD P. ROSTON, CHARLES J. JACOBUS

Title: GYRO-STABILIZED PLATFORMS FOR FORCE-FEEDBACK APPLICATIONS

5/19/98
11/19/02 *due*

Assignment: 1

Reel/Frame: <u>009570/0037</u>	Received: 02/25/1999	Recorded: 02/25/1999	Mailed: 03/01/1999	Pages: 14
---------------------------------------	--------------------------------	--------------------------------	------------------------------	---------------------

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignor: CYBERNET SYSTEMS CORPORATION

Exec Dt: 02/22/1999

Assignee: CYBERNET HAPTIC SYSTEMS CORPORATION

727 AIRPORT BLVD.

ANN ARBOR, MICHIGAN 48108

Correspondent: CYBERNET SYSTEMS CORPORATION

CHARLES JACOBUS

727 AIRPORT BLVD.

ANN ARBOR, MI 48108

Assignment: 2

Reel/Frame: <u>010395/0372</u>	Received: 11/30/1999	Recorded: 11/23/1999	Mailed: 02/24/2000	Pages: 3
---------------------------------------	--------------------------------	--------------------------------	------------------------------	--------------------

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors: ROSTON, GERALD P.

Exec Dt: 11/04/1999

JACOBUS, CHARLES J

Exec Dt: 11/12/1999

Assignee: CYBERNET HAPTIC SYSTEMS CORPORATION

2158 PARAGON DRIVE

SAN JOSE, CALIFORNIA 95131

Correspondent: HICKMAN STEPHENS & COLEMAN, LLP

PAUL L. HICKMAN

PO BOX 52037

PALO ALTO, CA 94303-0746

Search Results as of: 5/29/2003 10:18:19 A.M.

If you have any comments or questions concerning the data displayed, contact OPR / Assignments at 703-308-9723
Web interface last modified: Oct. 5, 2002